

**RECOMMENDED GUIDELINES ON MANAGEMENT OF
TRANSLOCATION OPERATIONS**

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1.0 INTRODUCTION

1.1 Definition

Translocation by definition is the deliberate and mediated movement of wild individuals to an existing population of conspecifics. In the context of this document, the term will be used in a broader sense to describe the movement of elephants from one area to another for eventual free release. The broader meaning of the term includes, Re-introduction (an attempt to establish a species in an area which was once a part of its habitat but from which it has since been extirpated, or become extinct) and re-enforcement /supplementation (addition of individuals to an existing population of conspecifics) (IUCN, 1998). Strictly speaking, the goals of KWS in translocation of elephants could be seen as re-enforcement. The two main areas to which most of the elephants are likely to be moved, Tsavo and Meru National Parks, are areas that need rebuilding of the elephant populations, decimated in the last two decades by poaching and habitat changes.

1.2 Justification for translocations in Kenya

Competition for land between people and wildlife in Kenya has drastically increased within the last three decades. This is due to the astronomical increase of the human population. There has been a six-fold increase of the population since the first National Park was established in Kenya in 1946. As a result, people have encroached into elephant habitats, cultivating in swamps and riverine areas and settling along elephant migratory routes with the consequent loss of large portions of elephant habitat. On the other hand, Kenya's elephant population has increased from 16,000 in 1989 when KWS was established to 30,000 in 2001. Severe conflict is therefore unavoidable as a consequence of these two opposing factors.

The human-elephant conflict may take either one or more of several forms such as;

- Destruction of crops
- Destruction of property such as water pipes, granaries, dams and buildings
- Loss of human life
- Competition with livestock for water and forage
- Curtailing of social activities such as schools and meetings

The consequence of these is the killing of elephants either by the local community or by KWS as communities demand protection from the animals.

KWS is however moving away from killing animals under the Problem Animal Control policy due to the high numbers of elephants that have had to be killed in the past due to the conflict. Although KWS has initiated other long-term management options such as electric fencing, it has been found that this option cannot be applied across-board due to vastness of land thus costs involved in building and maintenance of the fences in certain areas of the elephant range. Translocations therefore remain the most effective medium term option that KWS is pursuing in such areas.

In addition, fencing in certain areas has led to elephant population pressure on the habitat leading to habitat destruction and threatening other species that share the same habitats. This becomes especially critical in areas that have been designated as conservation areas for certain endangered species such as the black rhino.

1.3 Objectives of translocation

Translocation should be considered as management option to fulfill the following objectives;

1. **To augment the local population**
2. **To re-colonize former habitats of the species**
3. **To stop or reduce habitat destruction**
4. **Reduction of human-elephant conflict**

Translocations are expensive undertakings and should therefore be based on sound scientific data before decision to move the animals is made. For each of the above objectives, certain data and information needs to be available before the commencement of the operation.

Table 1.3: Information needed to support objectives of translocations

OJECTIVE	INFORMATION AND DATA NEEDED
1. To augment the local population	<ul style="list-style-type: none"> i) Current population of elephants in the target area, the population structure, and the estimated growth rate of the population. ii) Postulated carrying capacity of the target area iii) Historical causes of the population decline iv) Whether the situation in the target area has changed sufficiently to allow rebuilding of the population. v) Required additional number of elephants to attain the base level from which the population can be calculated to grow to reach the postulated number. vi) Estimated time scale for the population build up to achieve targeted number vii) Postulated future management strategy to maintain the population at the required level
2. To re-colonize former habitats of the species	<ul style="list-style-type: none"> i) Historical causes of population decimation ii) Environmental changes since the species was decimated iii) Impact of re-introduction of the species on the environment iv) Minimum number required for sustainable re-colonization
3. To stop or reduce habitat destruction	<ul style="list-style-type: none"> i) Is it a sign of stress within the population due over-population- the translocation should then be focused on population reduction, i.e removal of family groups- if the population numbers are high, long term rather than short term plans are preferable to achieve stated objectives. ii) Is it due to changes in the environment leading to

	<p>iii) reduced availability of specific micro-nutrients</p> <p>Is a whole population problem or specific groups within the population- is moving certain population groups a viable population management option?</p>
4. Reduction of human-elephant conflict	<p>i) Is conflict seasonal or continuous</p> <p>ii) Is it a population density issue due to reduced elephant habitat?</p> <p>iii) Are there other management options to reduce conflict e.g. fencing, that may have higher chances of success than translocation</p>

1.4 Prerequisites for success of re-introductions

- The population being built up must be well managed, self sustaining and have broad genetic representation to help it endure foreseeable perturbations
- Suitability of habitat- scientific data should be available on suitability of the habitat. Major considerations should be given to carrying capacity, and security of the area
- Removal of factors detrimental to population growth- Historical causes for population reduction in the recipient area need to be well understood
- Feasibility studies- Detailed studies need to have been carried out on the following;
 - The movement patterns
 - The home range
 - Habitat preferences
 - Feeding and foraging behaviour
 - Shelter requirements
 - Choice of release site should be within the historic range for elephants
 - Should not be saturated with a stable natural population unless aim is to alter genetic makeup of the population
 - Choosing individuals for translocation- for re-introductions, breeding individuals in a cohesive social group should be a priority- the sex ratios need to be considered
 - Social – political and cultural considerations; public opinion on the translocation should be sought and information on demerits and merits of the project well communicated. The consultations need to be as broad based as possible.
- Funding; Translocations are expensive and sufficient funding need to be assured before the project can commence

2.0 PLANNING AND PREPARATION FOR A TRANSLOCATION

2.1 Project co-ordination

A translocation project is time consuming and requires a lot of details worked out before the actual operation. In addition, certain activities, such as pre-translocation monitoring

and fund raising may require up to one year in advance of the operation. Planning for translocation is therefore critical and must be long term.

2.1.1 Co-ordinating committee

A translocation co-ordinating committee should be set up. It should be a multi-disciplinary team, closely linked to all the interested parties and stakeholders.

Representation of the committee;

- Elephant management team (Elephant Programme),
- Veterinary team
- Capture team
- Air-wing
- Representatives of the area managers for the donor and recipient areas.

The team should create the following positions;

- Head of the operation together with a management hierarchy with clear reporting lines specifically for the operation
- Logistics officer or team- responsible to ensure that all the necessary details of the operation are followed up and executed.
- Fund raising officer or team depending on the mode of fund raising, who should report to the committee on the progress of fund raising on a regular basis until the start of the operation.

Duties of the translocation co-ordinating committee;

1. Plan for all the aspects of the operation
2. Ensure funding needed for the operation is available before the proposed date of the operation
3. Ensure pre-translocation monitoring is done well in advance of the proposed date
4. Ensure all the equipment needed for the operation is available and in working condition
5. Ensure all the personnel requirements are met before the operation
6. Ensure a broad based consultations with all the stake holders before the commencement of the operation
7. Manage the media coverage of the operation to ensure desired perception of the operation by the general public.
8. Institutionalise a post-translocation strategy to ensure objectives of the operation are achieved

2.2 Budgeting

Budgeting for a translocation operation is critical and should cover all costs of the operation and have a broad contingency coverage to ensure all unexpected costs are covered under the budget. Before the budget is prepared, it is important to determine;

1. Number of elephants to be moved- this should include the age structure and composition of targeted individuals or groups. These will determine the number of days, personnel and type of equipment
2. Veterinary drugs, darts and accessories, laboratory consumables and equipment - quantities determined by the number and age of elephants to be captured as well as duration of anesthesia plus contingencies for missed and malfunctioning darts.

International procurements should be done more than three months before the date of operation

3. Mileage- determines the amount of fuel and maintenance for vehicles, aeroplanes and machines - the distance of the capture site from the headquarters as well as distance from capture site to release site, including distance within the capture site and release sites should be taken into account. A large contingency for the unexpected should be included- e.g changes of route for one reason or another, breakdowns etc.
4. Personnel- Also determined by number of animals to be moved at a time
5. Aircraft support- At least one chopper and one fixed wing aircraft should be planned for. Aircraft charge for the flying time and estimated flying time should include, hovering and searching and greatest distance from landing site to capture site.
6. Post release monitoring- radio collars and receivers, aerial support, vehicle and personnel costs should be included
7. Vehicles and equipment fuel, service and maintenance and contingencies for breakdowns should be included.
8. Contingencies- translocations are affected by the unpredictability of events during the operations and a large contingency fund needs to be set aside for these.
9. Equipment- purchases needed, repairs and replacements before the start of the operation

The budget should cover for three main categories of costs, **Planning**, **Execution** and **Monitoring**.

Planning costs

1. Pre- translocation monitoring costs
2. Fund-raising costs
3. Purchasing costs- includes shipping, clearing and storage costs of all items purchased before the operation
4. Personnel costs

Execution costs

1. Road repairs
2. Camp set-up and operating costs
3. Personnel costs- number of people time and wage rates
4. Materials and supplies- veterinary, laboratory, etc
5. Vehicles- including fuel, lubricants and maintenance costs
6. Costs for air support- fuel, per hour billing rates etc
7. Transport and accommodation costs for administrators, managers, dignitaries, staff, observers and workers to and from the capture site
8. Co-ordination and communications costs
9. Translocation execution at capture site- cost of capture day activities not included elsewhere
10. Cost of elephant transportation to release site
11. Capture site clean up and exodus costs

Monitoring costs

Costs of maintaining elephants in a holding area

Costs of releasing the elephants

Costs of monitoring and protecting released elephants

2.3 Procurement procedures

Procurement procedures take time and these should be done well before the targeted date of the operation. Drugs and equipment for translocations often have to be imported and this should be borne in mind during the preparation of the translocation. For instance, procurement of immobilisation drugs and darting equipment take a minimum of 7 weeks. In addition, various licences are required and these should be acquired well before the date of operation.

2.4 Fund Raising

Translocations are expensive and it is difficult for any organisation to have a budget sufficient for them. It is therefore critical to have a fund raising plan for all translocations planned for. Long term planning is essential to allow for sufficient time for fund raising. Translocations should not be seen as emergency appeals by donors, as this is indication of lack of forward planning. Most donors will have 1, 2.5, and 5-year plans for funding. This should therefore be borne in mind during the planning for the translocation. Translocations should fall within a 5 –10 year management plan to ensure adequate time for fund raising as well as collection of the necessary information needed for funding proposals.

2.5 Pre-translocation monitoring

2.5.1 Purpose of pre-translocation monitoring

Pre-translocation monitoring to identify target animals for translocation and to determine the population parameters of the targeted population is essential. Time must be given to allow for a study of the target population. Population parameters needed before the translocation are;

- Size of total population
- Population structure; i.e. sex ratio, ratio of calves, juveniles to adult population,
- Individual identification of the adult population including identification of the discrete family groups, social order within family groups and family sizes
- Approximate size, sex and age of target animals
- Distribution and home ranges of the elephants
- Seasonal dynamics in elephant movements and distribution

2.5.2 Period of pre-translocation monitoring

The period of pre-translocation monitoring will vary depending on;

- i) Number and sex to be moved. Identification of family groups and the associations between individuals could take as long as one year especially if the total population in the area of interest is large.
- ii) Population size of the donor population
- iii) Terrain and habitat type of the donor area
- iv) The target population segment. Pre-translocation monitoring will help in ensuring that the donor population is not compromised by the translocation, unless the entire population needs to be moved.

Detailed information from the pre-translocation monitoring should be communicated to the capture team during the planning stage of the translocation to ensure the right equipment is provided for.

2.6 Assessment of disease risk in elephant translocation

Diseases of concern during movement of animals fall in three categories. 1) diseases that compromise the well being of the animals during movement or capture 2) infectious diseases that may be spread from one area to another during movement and 3) diseases endemic in the destination area not found in the donor area, that may compromise the health of the translocated animals. Under free ranging conditions, diseases of the first category cannot be tested until the animal is immobilized and this risk is always there in all immobilizations. This risk needs to be recognized but little can be done about it. In this category are physiological conditions that lead to anaesthetic emergencies. Drugs for management of anaesthetic emergencies such as respiratory stimulants, drugs to manage shock need to be available during all immobilizations.

Although literature on the diseases of free ranging African elephants is scarce, so far no disease of economic importance has been identified in elephant populations that fall in the second category. Although the African elephant can contract Foot and mouth disease and shed the virus, there has been no evidence that the species can transmit the disease (Colly, 1991). No disease in the 3rd category has been identified to be of significance in elephants.

It can thus be concluded that though the issue of disease risk should always be borne in mind, current available information does not support expenditure of resources on the issue of disease risk before and during translocations. However, samples that can be used for testing diseases from all immobilized elephants should be carefully stored for future eventualities. Thorough post-mortems need to be carried out in cases of mortality both during translocation operations as well as routinely with a view of a continuous monitoring of possible disease conditions.

2.7 Personnel requirements

2.7.1 Categories of translocation personnel

Translocation of elephants requires experienced and committed personnel to ensure safety of the animals as well as the personnel. The number of personnel will depend on the number of animals to be captured at a time and the translocation team should be selected well in advance and information passed to them on the time table of the translocation to avoid last minute cancellations especially for essential personnel. The team should consist of;

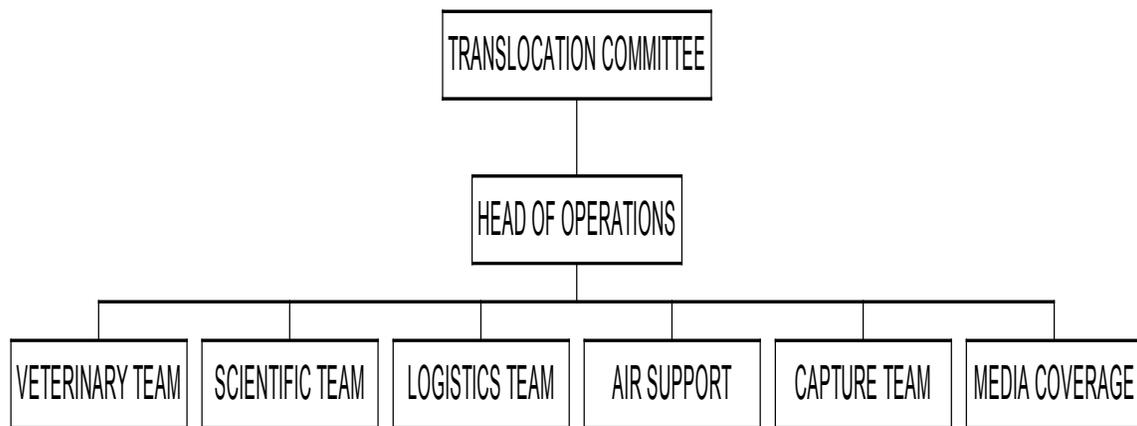
- Experienced wildlife veterinarians
- Researchers (pre and post translocation monitoring)
- Capture personnel
- Multimedia personnel
- Drivers
- Plant operators
- Mechanics and welders
- Experienced game capture pilots (helicopter and fixed wing)
- Aircraft attendant

- Logistics personnel.
- Casuals (as required)

A translocation operation requires precision and order and should therefore be run with strict discipline. A management hierarchy with a clear line of command and responsibilities for the team is therefore essential. Non-essential personnel should be kept to a minimum and should have clear instructions on where to be at every stage.

2.7.2 MANAGEMENT STRUCTURE FOR A TRANSLOCATION TEAM

TRANSLOCATION TEAM MANAGEMENT STRUCTURE



2.8 Community sensitization

- Communities living around both donor and recipient areas are in essence the major stakeholders as they often bear the brunt of human/elephant conflict. They should therefore be given priority in passing information on management decisions that affect the elephant population in their areas.
- Community wildlife officers should be conversant with the translocation plans and time table in order to pass correct information to the community
- The translocation team should include personnel with media expertise to determine the kind of message that needs to be passed down to the communities.
- Negative messages should be avoided especially where the goal of the translocation is to alleviate human/elephant conflict. The communities in the recipient area should be given the perspective of building up elephant numbers in their area for tourism and conservation purposes.

3.0 EXECUTION OF A TRANSLOCATION OPERATION

3.1 Preparatory activities

3.1.1 Route survey

- The route should be selected carefully to allow for the shortest possible driving time and to ensure that, towns and mountainous areas are avoided.

- It should take into consideration the need for fuel stops, and where possible reserve fuel made available to avoid stops in populated areas, where curious onlookers may increase to the stress of the animals.
- The route survey should be done in the same season as the translocation.
- A quick survey just before the operation should be done in case of new developments on the road since the first route survey

3.1.2 Base camp preparation

The site for the camp should be well chosen with the following considerations;

- Exit and entrance for large trucks
- Sufficient size to accommodate all equipment
- Consider the direction of the wind
- Consider availability of water
- Consider the landing site for a chopper- should be in the wind and not near tents
- Consider drainage
- Ensure minimal habitat destruction
- Consider sanitary precaution-latrines and refuse disposal
- An already established camping site if of sufficient size would be preferable due to availability of the amenities.
- The base camp should be as close as possible to the capture site to avoid time wastage during the capture operation.

3.1.3 Equipment preparation

- All equipment to be used in the operation should be serviced and all repairs carried out before the date of the operation.
- Equipment should be given a service rating and essential equipment with doubtful performance rating should not be used.
- Spare parts for all equipment should be available on short notice.
- All equipment to be used must be serviceable and availability of spare parts ensured beforehand.
- Equipment that cannot be serviced within the country should not be used without ensuring alternatives are also available in case of breakdowns.
- Servicing personnel such as mechanics should be part of the translocation team.

3.1.4 Personnel preparation and mobilisation

- All personnel to be involved in the translocation should have the time-table of the operation with clear guidelines on when and where to be on specific dates.
- Transport to the base camp should be ensured for all essential personnel.
- All essential personnel should preferably be camped at the base camp for ease of planning and mobilisation.
- The head of the operation should hold a briefing for all the personnel on the eve of the capture operation.
- Specific roles and duties should be made clear for each individual with a clear description of the mode of operation from the start to the end.
- Debriefing meetings should be held at the end of every capture day. Methods can then be reviewed and changes made accordingly.

- The team should take stock of all equipment and any breakdowns repaired before the start of the next day of capture.
- Communication channels should be reviewed during the debriefing meetings and solutions found for any operation shortfalls.

3.2 Capture operation

3.2.1 Finding the target animals

Steps to be followed;

1. A fixed wing plane with a pilot and a spotter with identification files of the target animals are the first to fly out at the beginning of the operation.
2. The ground team, who must be in constant radio contact with the aircraft, move out next as directed by the spotter aircraft. The ground team, which is also the recovery team consists of veterinarians, capture personnel and armed security personnel. The security personnel must have heavy calibre rifles and must be experienced in large animal control.
3. Once the target animal/group is spotted, the ground team should be directed to wait at a suitable area as close as possible to area the animals are likely to go down.

NB. It should be borne in mind that animals sometimes run for a distance after darting and the spotter plane must therefore keep sight of them until all the animals go down.

3.2.2 Darting

1. The darting team consisting of a chopper pilot and the darting personnel (veterinarians) stay on standby until the target animals are found. This reduces unnecessary helicopter airtime.
2. Once the animals have been spotted and the ground team is in position, the helicopter with the darting personnel move in, drive the animals to a suitable area, preferably close to the access road and commence darting.

Points to note during darting

- Darting is done using appropriate equipment e.g. Palmer Cap-chur® long- range rifle. The darting equipment should be tested beforehand to ensure proper functioning.
- Radio communication between all the teams is essential.
- The helicopter should herd the darted animals to ensure they go down in a suitable area but once the immobilizing drug begins to have effect, it should withdraw.
- The fixed wing should keep all the animals in view until they go down and should direct the ground team to the animal(s) as soon as the animals stop moving before final recumbency.

3.2.3 Recommended Drug dosages

Table 3.2a: Immobilization drug and antidote doses for adult elephants (Raath, 1993)

	Etorphine(mg)	Carfentanil(mg)	Diprenorphine(mg)	Naltrexone(mg)
Adult bulls	16 –19		48	-
		12	29	480
Adult cow	12-17	-	36	
		10	24	400

Table 3.2b: Immobilising drugs and antidote doses for calves (Raath, 1993)

Calf(shoulder height in metres)	Etorphine(mg)	Carfentanil(mg)	Azaperone(mg)	Diprenorphine(mg)	Naltrexone(mg)
Small 1-1.4	5		40	15	
		3	40	7	120
Medium(1.5-1.7	7		50	21	
		5	50	12	200
Large(1.8m	9		70	27	
		7	70	17	280
Top up	3		20	-	-
		2	20	-	-

(Hyaluronidase added at 5000i.u for adults and 2500i.u for calves ensures quick absorption of the drug, if dart needles used are long enough to get deep intra-muscular injection)

3.2.4 Darting family groups

- When dealing with family groups, a variety of darts with M99 should be prepared in advance with dosage for 3 age groups based on height estimates from the helicopter. These are adults(12mg), sub-adults (5mg) and juveniles (3mg) (table 3.2.2a&b for dosages). The remainder of the dart is filled with azaperone(table 3.8 for dosages).
- The matriarch should be darted first, followed by the older females in the herd then the juveniles.
- After darting the adult animals, the chopper may choose to fly higher to give time for them to go down while ensuring they come down close together and in suitable terrain. The younger animals are then darted.
- Very young calves, under 1 meter in height, should not be darted but should be manually restrained by experienced personnel, tranquilized with 5mg Azaperone intramuscularly and loaded in a separate container after all the other animals are recumbent.

3.2.5 Management of recumbent animals

- Trunks of all the animals are checked to ensure that the darted animals are breathing easily.
- Any animal that goes on sternal recumbency should be pushed over to lie on lateral recumbency as soon as possible to avoid compromise on the respiration.
- Ears should be folded over the eyes and sprayed with water from a rucksack sprayer.
- It is critical for the ground team to get to the animals as soon as possible to avoid lying on the trunk or other awkward positions that may compromise the health of the animal.
- Once the animal is in a stable state of anaesthesia, the physiological vital parameters should be monitored at regular 5-minute intervals and recorded.

Table 3.3: Vital parameters of the African Elephant

	Adult (per minute)	Calf (per minute)
Heart rate	28-50	40 -60
Respiration	3-8	8-16
Temperature	35- 37	38.5

- Body measurements and laboratory samples are taken once the animal is in a stable anaesthetic state. The shoulder height is especially important to ensure each animal is loaded into the correct sized crate. The sexes and age groups are determined at this time., and
- A thorough physical examination should be done, the dart wound treated with antibiotics and any other treatment carried out at this stage. In case the animal gets into a lighter state of anaesthesia, additional immobilizing drug (etorphine) should be added upto $\frac{1}{4}$ the original dose.

3.2.6 Laboratory sampling protocol

- It is essential to have personnel to deal with laboratory issues in translocations, as it is easy to overlook sampling in the stress of the operation.
- A nearby laboratory should be identified where samples taken can be analysed. Where this is not possible, field equipment that can be used for simple analysis such as haematology and biochemistry should be planned for.
- Equipment for field refrigeration is useful in translocations. This is especially useful in situations where elephant translocations are foreseen as routine operations.
- Haematology samples should be analysed as soon as possible while separation of serum from blood must be done within 6 hours after collection and stored in liquid nitrogen.
- Blood smears for WBC counts and examination of blood parasites should be made fresh, dried and stored properly for staining after the operation.
- External parasites should be collected and stored in 70% alcohol. Tissues and hair samples should be stored in DMSO for genetic analysis. Care must be taken to label all samples at the collection point to avoid confusion.

3.2.7 Body Measurements

- The following body parameters are often taken. Care must be taken to standardize measurements to reduce errors.
 - The shoulder height (essential for loading animals in the correct crates)
 - Neck to tail length (Tusk- base circumference, outside and inside curve lengths and straight base to tip length)
 - Trunk length
 - Feet- rear and front- circumference, base width, and diameter
 - Age

3.2.8 Anaesthetic emergencies

- Apnea or compromised respiration: Drug of choice is Doxapram, administered I.V. The 400mg bottle is required.
- High mean arterial pressure: the drugs of choice are azaperone (50mg I.M for adults), membrane stabilizers, such as corticosteroids or flunixin meglumine.
- For elephant presenting a completely compromised anaesthetic state, the anaesthesia should be reversed, taking care to ensure no injury to other personnel in the vicinity of the animal.

3.2.9 Procedure in case of serious injury or death of elephant during translocation

- In case of life threatening injury that cannot be treated, the veterinarian in charge will have the discretion to humanely put the animal down after informing the necessary authority present.
- All cases of death should be reported to the necessary authorities (head of elephant programme, Director etc.) as soon as possible.
- A complete post mortem must be carried out regardless of the evident cause of death and a summary of the report relayed to the necessary authorities within 24 hours
- Recovery of trophies and disposal of the carcass must be done by KWS personnel.

3.3 Loading immobilized animals

Loading of elephants into crates often takes long and the loading process should be well thought through beforehand. It often happens that the transport truck cannot reach the area where the animal went down and in that case the immobilized elephant needs to be transported to the loading area.

3.3.1 Recovery from point of immobilization

- A tractor with a winch and a tipper trailer is ideal as a recovery vehicle because of its ability to drive through almost any terrain as well as manouverbility of the trailer for ease of loading the immobilized elephant.
- A conveyor belting, at least 2m long and 1 metre wide is laid out on the dorsal side of the elephant opposite to the limbs. The elephant is then rolled over onto the belt, after tying its limbs together using a sisal or cotton rope of at least 1 ½ inch.
- The trailer is then tipped down so that the back end is firmly resting on the ground. The conveyor belting with the elephant on top is then winched onto the trailer head-

first. Care should be taken to ensure the limbs do not get stuck as the conveyor is being winched as this can cause injury.

- Once the whole length of the animal is in the trailer the end of the conveyor is then tied to the front of the trailer to prevent sliding during transportation. The trailer is then tipped back up and the animal transported to the loading area.

3.3.2 Loading onto transport crates

- The immobilised animal can be loaded directly into the transport crate if to be transported alone but if it is to be transported in a mass crate, it should be transferred from the trailer into a recovery crate. Here it is revived and then transferred into the mass crate for transportation.
- The animal can be winched into normal crate lying on its side and the revival drug (M5050) injected I.V. at 4 times the etorphine dose. As the animal begins to revive, the crate is lifted slowly upright using the Hannibal lifting cranes with the upright position coinciding with the animal getting fully on its feet.
- An alternative to this is to have a special recovery crate constructed of sufficient size to allow an adult elephant to stand upright in it. In this case the recumbent animal is winched from the tractor- trailer into the recovery crate, the doors closed and the animal revived. The recovery crate should already be aligned with the mass crate so that when the animal gets onto its feet it can be encouraged to walk into the transport crate and the sliding doors of the crates shut behind it.

3.3.3 Tranquillization of elephants

The capture and transportation of elephants involves intrusion into the animal's normal daily activities and it therefore causes acute stress to the animal. Tranquillizers are used to reduce the effect of the stress on the animal's physiological state.

- Tranquillizers should be administered at the time of loading before the animal is revived.
- The type of tranquillizers used will depend on the duration the animal is expected to be in captivity.
- Tranquillizers should be timed so that by the time of release, the effects of the drugs have waned to unnoticeable levels.
- The alternatives in a translocation operation is to use either short acting tranquillizers and keep topping up as the effects wear off or combine short acting with medium to long acting tranquillizers depending on the estimated time to release of the animals.
- Long acting tranquillizers are usually in a depot form and take long to be absorbed into the animal's circulatory system. The lag period between injection and the peak effect should therefore be covered by a short acting drug, whose effects wear off just before the long acting tranquillizer gets to its peak effect.

Examples of tranquillizing drugs

Short term tranquillizers (up to 15 hours effect)

- i) Azaperone (Stresnil®): 120 mg for adult elephants, 60 – 100mg for subadults, 20 – 50mg for calves

- ii) Xylazine (Rompun®): 80 – 120 mg for adults, 40 – 80mg for subadults, 10-20 mg for calves
- iii) Acepromazine
- iv) Detomidine

Medium range acting tranquilizers

- i) Haloperidol – up to 20 hours
- ii) Zuclopenthixol – up to 60 hours

Long acting tranquilizers

- i) Perphenazine – up to 150 hrs dosages; 100mg for young elephants (<1.8) (1.8 - 2.0 meters shoulder height- 200 mg, 200 –250 mg upto 15 year olds, adults- 300mg (Ebedes 1993)

Table 3.4 Dosage rates for tranquillizing drugs in elephants (Du Toit 2001)

Shoulder height(m)	Total Dose (mg)
Azaperone	
<1.2	10 – 20
1.2 – 1.5	50
1.5 – 2.0	100
All lactating females	150
2.0-2.4	150
>2.4	200
Haloperidol	
1.6-1.69	40
1.7-1.79	50
1.8-1.89	60
1.9-2.09	70
2.1-2.19	80
2.2-2.39	100
>2.4	120
Trilafon	
1.0-1.49	100-150
1.5-1.99	150-200
2.0-2.49	200-250
2.5-2.99	250-300

3.4 Transporting animals

3.4.1 Points to note during transportation;

- The head of the operation should appoint a convoy commander
- All the drivers must be briefed on route, speed and any planned stops before departure
- The convoy must be escorted by another vehicle.

- Good communication is essential between vehicles and with base camp as well as release site.
- Animal on transit should be checked regularly
- Fuelling at petrol stations should be avoided as much as possible
- Personnel should carry packed meals to avoid stops.

3.4.2 Golden rules during transportation;

1. Never mix family groups
2. Tranquilize animals before transport- be careful not to overdose because animals may lie on sternal recumbency and die during transportation.
3. Load females with calves together but separately from sub adults (1.5-2.1m height). Adult bulls should be transported alone
4. Enough bedding material (straw) to absorb urine should be provided

3.4.3 Accompanying equipment

Dart gun and dart box, powerful torch, cattle prod, heavy calibre rifle, hose-pipe and water containers

3.5 Releasing of animals

- If destination is a large conservation area, animals must be released in an enclosed area at first to allow for acclimatization.
- Family groups should be released into Bomas to ensure they do not separate at release. The animals must not be heavily sedated at the time of release and drugs used must be calculated to have effect as close to the duration of travel as possible.
- Once the animals are successfully released, information should be relayed back to the base camp and crates and vehicles checked for needed repairs.

3.5.2 Importance of Elephant confinement during translocation

- A confinement of elephants at the destination allows the animals to calm down, get used to new sights and sounds of the new area and get used to electric fencing therefore reducing fence breaking and conflicts.
- Confinement also gives family groups time to regroup after the stress of capture and therefore decreases time needed to adapt to new environment.
- In areas that have translocation as a long term population rebuilding strategy, elephant holding bomas should be planned for.
- At destination, transport crates should be left open at the elephant bomas and the animals allowed to come out at leisure and regroup overnight. The holding pen should then be left open for the animals to move out into the conservation area after a few hours of confinement (Appendix 1 – 5 for boma specifications)

3.6 Radio communication protocol

- Central Radio operator (technician) based at the base camp should co-ordinate and pass all information to the necessary personnel.
- Communication should go through the operation commander or his designated alternative. Independent communications should be avoided unless under duress
- Radio discipline should be adhered to.

- All vehicles mounted radios should be in the designated channel and kept open especially on transit.

3.7 Aerial support protocol

Clearances required;

- Department of defense clearance- this is needed in advance of the operations- at least 72 hours before the planned flight
- Directorate of Civil Aviation- this is unrestricted and is obtained when flight is due
- Foreign country- clearance from the customs necessary. Customs and immigration department must be informed especially with government aircraft
- All letter of clearance must be available to the pilot or operation commander before any departure
- Pilots must be well briefed before the start of the operation and should be familiar with the area.

3.8 Observer protocol

- All observers must have due permission from KWS
- Access to the translocation site is on condition of strict adherence to the regulation set by the authority in charge.
- Observers must avoid going to non-designated areas and should not interfere with the operation, especially when attempting to take pictures
- The head of the operation reserves the right to reside access to operation site in case of interference.

3.9 Media coverage protocol

3.9.1 Importance of media coverage

- Media coverage for translocation operations is important for the purposes of creating and managing public opinion on the operation as well as public education.
- These enable KWS to establish linkages and foster good linkages with communities and the general public, who ultimately are the owners of wildlife resources. Media coverage therefore needs to be well managed to produce the required effect.
- The KWS communication personnel should therefore be included as part and parcel of the operation and included while planning for personnel. Their role needs to be recognised and supported.

3.9.2 Responsibilities of the communication team

- Preparation of press releases. These should be correctly timed and worded to create the desired perception
- Updating of the KWS website on the translocation
- Respond to inquiries and queries that arise during the operation
- Prepare press conferences, discussions, talk shows and supplements and documentaries in print and electronic media as and when necessary
- Be involved in the preparatory community education

3.9.3 Management of external media

- The KWS communication team should manage all contacts and contracts with external media and ensure rights on the coverage of the translocation events are not infringed.
- Costs of buying footage on the operations shall be worked out and contracts signed according to KWS policy.
- No unauthorised media coverage and video footage will be allowed during the operations.

3.10 General conduct at the base camp

- Discipline must be maintained at the camp with orderliness and soberness
- Sanitary conditions must be maintained
- Personnel involved in the operation must not leave without permission or knowledge of the operations commander who shall assign duties as necessary
- Personal safety is the responsibility of the individual and the following rules should be observed;
- Not leaving the base camp at night
- Use spotlights while moving around the camp
- Tents must remain closed while absent
- Avoid walking in areas with dangerous wildlife without proper security
- Warn other of approaching wildlife and ensure proper behaviour in case of accidental meetings
- All equipment breakdown must be reported promptly

3.11 Procedure in case of serious injury or death of personnel

- Capture of wildlife is a potentially dangerous exercise and it is essential to have first aid equipment and trained personnel in all operations handy at all a times. All capture personnel should be trained in first aid techniques.
- All injuries must be reported to the head of the operations as soon possible and first aid a given immediately.
- Injured personnel must be evacuated to the nearest hospital as soon as possible.
- Evacuation procedures should be worked out before the commencement of the operation. The nearest hospitable must be identified beforehand.
- The KWS Director must be informed as soon as possible serious injury or death.
- In case of death, the operation should be suspended to allow for investigation/recovery of other personnel from psychological trauma
- Any injury/death shall be resolved by concerned party under the terms of service of the respective employer.
- Any personnel participating in the operation not directly employed by KWS shall do so at their own risk and the organisation shall not be liable to any injury so arising for any reason.

3.12 Translocation equipment checklist

3.12.1 General translocation equipment

Equipment	Numbers required
Crates (for family groups)	1
Conveyor belts	2
Tarimbos	8
Pangas	8
Jembes	6
Axes	6
Spotlights	2
Spades	2
Generator	1
Pic axes	2
Jerrycans(metal)	6
Plastic water drums	2
Strainers	4
Knap sack sprayers	4
Tape measure	2
Harmers	2
Fuel pump	1
Sledge hammer	1
Hacksaw	1(dozen blades)
Welding machine	1
Welding rods	2 dozen
Welding gas and accessories	
Chain saw	
Adjustable spanner	
Ropes (Sisal 1 ½ “ size)	1roll
Ropes (Cotton)	6x3m
Vehicles	
Low loader	2
Volvo trucks	2
Recovery tractors with tipping trailers and winch	2
Bulldozer	1
10 tonner truck (with removable sides)	1
Land rover/land cruiser	5
3 tonner truck	1
Communication equipment	
Air bands (with extra batteries)	4
Chargers	4
Multiple rapid charger	
Hand held radios(motorolla)	8
HF radios	2(escort vehicle and base camp)
GPS	2

Camping equipment	
Officer tents	14
Other tents	20
Camping chairs	20
Camping beds	20
Camping table	20
Washing basins	6
Hurricane lamps	20
Gas lamps	4
Cooking utensils	
Gas cooker	1
Sufurias	6
Mugs	30
Kettles	4
Plates	30
Spoons	30
Mekos(gas cookers)	2
Forks	30
Gas cylinders	4
Regulator and pipes	2

3.12.2 Veterinary equipment

Darting equipment

1. Long range Palmer cap -chur rifles- 4-5 per operation
2. Different sizes of Palmer cap-chur darts and accessories in sufficient quantities
3. Radio-tracking darts
4. Short range dart pistols (Telinject)– at least one must accompany each transport convoy
5. Varied sizes of darts and dart accessories for short range pistol

Drugs check list

- Etorphine hydrochloride
- Diprenorphine(M5050)/Nalorphine/Naltrexone
- Narcan
- Long acting penicillin
- Intramammary antibiotics (dart wounds)
- Ophthalmic ointment (eye protection)
- Tranquillizers
- Azaperone(Stresnil)
- Haloperidol(Serenace)
- Perphenazine(Trilafon)
- 8. Emergency drugs

Adrenaline
Doxapram
Finadyne
9. Wounds: Antibiotic spray/ ointment/Betadine
10. Acaricide:Ivomec
11. Syringes and needles
12. Blood collection tubes

3.12.3 Laboratory equipment

1. Micro-heamotocrit readers
2. BP machine
3. Field centrifuge
4. Cool boxes
5. Hemocytometer set
6. MacMaster slide
7. Microchip equipment

3.12.4 Post-mortem equipment

- Complete kits for elephants
- Hooks
- Saw
- Axes
- Shovels
- Block and tackle
- Rope and chain
- Wheel barrows
- Wiresaw
- Knives
- Knife sharpener
- Waterproof aprons

4.0 Post- release monitoring

- The success of any translocation operation can only be measured by the achievement of the proposed operation objective and the health and proper acclimatization of the translocated animals.
- Every translocation budget should include the costs of post translocation monitoring
- Post translocation personnel need to be identified and the necessary equipment availed for the monitoring before the translocation operation is undertaken. These include vehicles, radio transmitter and GPS
- Radio collars should be fitted on at least one and preferably more members each family unit translocated for ease of monitoring and to confirm whether the families stay together as a unit after the translocation
- Since the two main recipient areas are already well known, monitoring programmes should be put in place in Meru and Tsavo National parks that will be able to follow up each new translocated group as it is brought in.

Appendix 5

Construction of elephant holding facilities

Decision to accommodate elephants must be accompanied by considerable planning and foresight. Construction of elephant holding a facility is expensive, and if only to be used once, the cost- benefit should be considered if other management alternatives are available. Possible future uses should be considered in advance to make the most of the opportunity to construct a multi-purpose enclosure.

A boma is used to prevent the disintegration of elephant groups that would follow a direct introduction. It also provides an exercise area to introduce the animals to each other, to the new environment, and to electric fences.

Selection of a suitable site

- The boma should preferably be in the centre of the reserve to minimize contact with fences immediately after release
- The site should be in a savanna woodland area with good quality natural food available in the immediate vicinity. This makes collection of feed during the boma period easier and provides adequate environment when animals are released
- The boma should be close to a reliable water source for provision of water during the boma period. An adult elephant may use up to 240litres of water per day
- The boma must be accessible to the vehicles that will deliver the elephants
- The area must be well drained with a slope of 5⁰ to prevent muddy conditions
- Large trees are necessary for shade, otherwise provide artificial shade
- The substrate on which the boma is built must be solid to prevent the elephants from pushing over the poles
- The boma should be protected from cold winds
- It must be away from busy roads, houses and other human disturbance
- There must be minimal gravel and loose rock in the boma in order to avoid foot problems. Big rocks and logs with smooth edges and at a sufficient height can be left in the boma to act as rubbing posts. Jagged edges may cause injury that often leads to cellulitis.
- Ensure protection from fires. Surround the boma with good fire breaks. Elephants easily panic at sight or smell of fire and could injure themselves.

Construction of the boma

Knowing how destructive and strong an elephant is rather build a strong stockade to prevent injuries caused by attempts to escape. A multi-purpose boma that could also be used for other species such as rhinos is more cost effective especially in areas that need a lot of animal re-introductions such as Meru National Park.

The Boma is built with round metal poles as anchor posts and tannalized gum poles as droppers. Tar poles could cause skin inflammation and should be avoided, or if used should be covered with mud on the inside of the boma. The boma consists of four pens of 25x25 m. Each pen can hold 4 to 6 animals. One pen should be left empty to shift animals for daily cleaning routine.

The off-loading ramp is positioned between the two outer pens, with a sliding gate that acts as the entrance to both the pens. The gate must be controllable from the outside of the boma. The inner pens are situated next to the exercise camp of 50 x 200 m (1 Ha) or half this size for less than 8 elephants

Boma wall

Steel pipes, 3 m long and 125-150mm in diameter are concreted 1 m deep (1m³ holes) at 3 m intervals. Cross-pieces of tannalized gum poles of 125-150mm in diameter and 3.1m long are connected to the top and bottom of the uprights. Reinforcing rod (12mm) or bolts can be used. If bolts are used the projecting ends should be on the outside of the boma. Upright poles 100 mm in diameter and 2 m long are attached with 100 mm intervening spaces to the inside of the horizontal poles. Both ends of the tannalized poles must be bound with wire to prevent splitting when holes are drilled through the poles.

Gates

The frames of the steel sliding gates (2 m high and 3 m wide) are made of channel iron. The vertical 75-mm pipes are welded with 75-mm intervening spaces onto the frame. A 6-m length of 50-mm channel iron must be cemented in position to act as guide for the gate wheels. Gates must be secured with a lockable mechanism that the elephants are unable to open.

Drinking troughs

Drinking troughs of 750-mm wide, 2 m long, and 400 mm deep with 100 mm elevation above the ground level are constructed along the side of each pen. Half the trough should be inside while the other half on the outside to allow for cleaning. Water is controlled by a ball-valve system on the outer part and together with its supply pipe, protected with weldmesh to prevent destruction by the elephants.

Feeding facilities

Fresh browse can be hung from the side of the boma or placed inside the boma on the ground. Concentrates should be supplied in containers attached to the outside of the boma wall. There should be one more trough than there are elephants, spaced as far apart as possible and also far from the water troughs to avoid messing and wastage. Suitable containers can be made out of cutting old car tyres in half, with the semi circular trough hung at least 1.2 m above the ground and firmly attached on the outside.

Shade

Artificial shade must be erected at twice the height of the elephants and situated in the middle of the boma to provide shade for all the 4 pens. The shade must cover at least 25m² for a pen of 25x25.

Off loading ramp

The off-loading ramp must be curved and provided with at least two sliding doors to prevent animals from turning back during off-loading. The chute must be at least 2.5m high, 1.5m wide and 10 m long. The wall can be constructed the same way as the boma

walls. The height of the off-loading ramp should be approximately 1.2 m at the off-loading point.

Exercise camp

Steel poles 2.75 m long and 125 mm diameter are cemented 750mm deep at 5 m intervals. Five cables (not less than 18mm diameter) are threaded through holes in the poles at ground level, 0.6m, 1.2m, 1.8m, and 2 m. Weld mesh (1.8m) is tied to the cable with baling wire on the inside of the enclosure. Three strands of electrified wire are attached on the inside of the fence at 0.6, 1.1 and 1.6 m above ground level.

The size of the exercise camp will depend on the number of elephants to be accommodated. A minimum of 1 hectare is recommended for more than 8 animals. Any trees in the enclosure for provision of shade must be protected with weldmesh to prevent debarking. A mud wallow is essential to allow the regulation of body temperature by bathing. Rock salt is important to elephants and should be placed throughout the exercise camp.

NB.

- Do not use cement walls: elephants will rub against cement walls and this may result in dermatitis.
- Do not use tar poles within a year after treatment as they may cause skin problems
- Inferior material should never be used- if in doubt, use bigger size

Enclosing part of the conservation area as a Temporary receiving facilities

Elephants that are already familiar with electric fencing can be held temporarily in a large enclosure fenced off the rest of the release site to allow for settling down and acclimatization in the new environment. The fencing should be similar to that found on the perimeter of the conservation area but with an area that can be taken down after some time to release the animals after they have settled down. Animal from the wild with no experience with electric fencing should be held in bomas as described above.

Temporary facility for juvenile animals has been described by Bengis (1993) as follows; An area of 1-3 hectares for a 2-4 weeks of confinement is adequate to hold 10-20 juvenile elephants. The enclosure is surrounded by a 2.5 m high three to six strand cable fence reinforced with capture netting, diamond mesh, Bonnox ® fencing or Veldspan® fencing (South Africa). This structure may be covered temporarily with game capture plastic. The sheeting is progressively taken down over the course of several weeks as the elephants become accustomed to their new quarters.

Electrification of the enclosure is essential, and two live wires at 0.75m and 1.5m above the ground can be used. This reduces ‘testing’ of the fence and accustoms the elephants to electrification similar to that at the perimeter of the conservation area. Firmly implanted (not cemented) sturdy poles placed 3-5 m apart must be used to support the whole structure. A single, wide access gate must be incorporated for the passage of vehicles and for later release of the elephants.

The holding enclosure must be sited at the proposed release area and should ideally incorporate shade trees and bushy refuge areas. Tall adult trees are important for shade as the elephants progressively clear the younger trees.

Several feeding points should be established along the perimeter fence. Bales of hay can be tossed over the fence at these points from the back of a vehicle to avoid entering the enclosure. Prior to release, the elephants should be fed just inside the gate.

Several water points should also be provided.

Release of elephants from this enclosure should be done quietly at night by leaving the gate open and allowing the elephants to emerge in their own time.

Appendix 6

SPECIFICATIONS FOR ELEPHANT TRANSPORT CRATES

Crates for calves and juveniles

Individual crates for the transportation of elephant calves are constructed of wood secured to a metal frame, with vertically sliding doors on either end. The “entrance” door is constructed of metal piping, which reduces the weight of the crate and allows medication to be administered through the openings between the bars.

The sides, top, floor and the remaining sliding door are of solid wood in a reinforced metal frame. The top and floor should have gaps between the wooden planks. These provide ventilation and allow urine, feces and water poured onto the animal to drain easily from the crate. The wooden door at the head end must have a 100mm-diameter hole in the center through which a rope can be passed. Crate dimensions for elephant calves are as follows;

Table 6: Dimensions of crates used for elephant calves (Raath, 1993)

Shoulder height	Length (mm)	Width (mm)	Height (mm)
1.15-1.4	2000	900	1900
1.4 – 1.6	2000	1100	1900
1.7- 1.9	2500	1200	2200

The shoulder height of the immobilised calf should be determined in order to select the right size of crate (N.B. The rump of the elephant is slightly higher than its shoulder). The crate should contain the calf comfortably, but should allow minimal extra space.

Appendix 7

RECOMMENDATION ON TRANSLOCATION REPORTING

There is a need to formalise the records needed for each translocation. They should include,

- **Problems leading to the need for translocation:** should be clearly stated and as much as possible scientifically supported. This will help in the formulation of the objectives of the translocation.
- **Objectives of the translocation;** should be clearly stated and measurable to allow for assessment of success rate.
- **Pre-translocation monitoring-** objectives of the pre-translocation monitoring should be spelt out beforehand. Results of the monitoring need to be available before the start of the capture operation and should be clearly linked to the capture to ensure selected animals are the same ones captured.
- **Details of events during translocation-** a clear record of the events during each capture operation need to be made. This will help in assessing the suitability of equipment and methodology employed and therefore allows for refinement in subsequent operations. At a finer level, each capture operation should be followed by a debriefing, before the subsequent capture during the translocation operation. This allows for improvements as the operation is continuing. Clear records of these need to be made for future reference.
- **Mortality-** Causes of mortalities occurring should be clearly stated and ways to avoid them explored. This should be part of the debriefing after each capture operation. A general mortality rate for the operation is an indication of the level of veterinary care during each translocation and should be clearly recorded with the causes for future reference.
- **Post translocation monitoring;** should have details of behavior after release, distribution and movement patterns and association with other elephants after settling down and post-release mortality
- **Effects of the translocation;** Post translocation monitoring should include assessment of the donor habitat for the effects of the translocation. This will help in assessment of the success in achieving stated objectives and therefore whether the translocation was worthwhile.

TABLE A7.1: SUMMARY IMMOBILISATION DATA SHEETS

Elephant I.D.	Sex	Shoulder height	Etorphine dose	Time darted	Time down	Duration of recumbency	Diprenorhine dose	Tranquillizer drugs given	Remarks

TABLE A7.2 TRANSLOCATION OPERATION SUMMARY DATA SHEETS

Translocation	Stated objective	Pre-transloaction monitoring(report available?)	Number moved	Mortality	Post translocation monitoring(report available?)	Measure of success

Appendix 8 TRANSLOCATION WORK PLAN

Personnel	Project activity timing and duration				Operation execution
	12months before	6 months before	3 months before	1 month before	
Translocation committee	Planning meetings				
Scientific team	Pre-translocation monitoring				Identification files
Veterinary team	Drugs and equipment procurement				Darting and monitoring
Airwing	Air clearance				Darting and spotting
Logistics team	Equipment procurement				Ensure smooth running of operation
Capture team	Equipment procurement				Loading and transportation
Media coverage team	Community sensitization				Electronic and print media coverage
Area warden(donor area)	Identification and definition of elephant problem (Community sensitization)				Administrative issues
Area warden(recipient area)	Identification and definition of need for elephant population re-enforcement (Community sensitization)				Receiving, release and monitoring of animals